

Claims

1. A method for presenting liquid samples for mass spectrometry comprising:

obtaining a sample presentation device configured to enable fluid communication from a microwell to at least one intermediate electro-wettable site and then to a terminal electro-wettable site,

delivering a volume of a liquid sample containing analytes to the microwell, and

directing the liquid sample from the microwell to the terminal electro-wettable site via the intermediate electro-wettable site by altering the wettability of the intermediate electro-wettable site and the terminal electro-wettable site in order to deposit the analytes on the terminal electro-wettable site.

2. The method of claim 1, wherein the wettability of each electro-wettable site is altered by selective electrical actuation of each electro-wettable site.

3. The method of claim 1, wherein the volume of the liquid sample is reduced as it is directed from the microwell to the terminal electro-wettable site.

4. The method of claim 1, wherein the volume of the liquid sample is sequentially reduced at each electro-wettable site by evaporation as the liquid sample is directed from the microwell to the terminal electro-wettable site.

5. The method of claim 1, wherein the volume of the liquid sample is sequentially reduced at each electro-wettable site by evaporation under ambient conditions as the liquid sample is directed from the microwell to the terminal electro-wettable site.

6. The method of claim 1, wherein the volume of the liquid sample is sequentially reduced via evaporation at each electro-wettable site by heating the liquid sample as the liquid sample is directed from the microwell to the terminal electro-wettable site.

7. The method of claim 1, wherein the terminal electro-wettable site is adapted to confine the deposition of analytes to within a predetermined area.

8. The method of claim 1, wherein the sample presentation device comprises a plurality of a sample presentation sites and wherein the liquid sample is delivered to each sample presentation site via liquid handling robots.

9. A device for presenting liquid samples for mass spectrometry comprising:

    a microwell adapted to receive a volume of a liquid sample containing analytes,

    at least one intermediate electro-wettable site contiguous with a portion of the microwell,

    a terminal electro-wettable site, and

    wherein the intermediate electro-wettable site is positioned between the microwell and the terminal electro-wettable site, and

    wherein the surface tension of the at least one intermediate electro-wettable site and surface tension of the terminal electro-wettable site are variably alterable to direct the movement of the liquid sample from the microwell to the terminal electro-wettable site via the at least one intermediate electro-wettable site for deposition of the analytes on the terminal electro-wettable site.

10. The device of claim 10, wherein the intermediary electro-wettable site has surface area which is greater than the surface area of the terminal electro-wettable site.

11. The device of claim 10, wherein a fluid path is defined by the microwell, the intermediary electro-wettable site and the terminal electro-wettable site, and wherein each successive site has a surface area which is equal to or less than that of the preceding electro-wettable site.

12. The device of claim 10, wherein each intermediary electro-wettable site between the microwell and the terminal electro-wettable site has surface area which is about half of the surface area of an adjacent intermediary terminal electro-wettable site and wherein the terminal electro-wettable site has surface area which is about half of the surface area of an adjacent intermediary terminal electro-wettable site.

13. The device of claim 10, wherein the microwell is adapted to contain the liquid sample.

14. The device of claim 10, wherein the microwell is adapted to contain the liquid sample by actuation of an electro-wettable zone.

15. The device of claim 10, wherein the microwell is adapted to contain the liquid sample via by a patterned zone exhibiting lower surface tension than a surrounding area.

16. The device of claim 10, wherein the microwell comprises an electro-wettable zone.

17. The device of claim 10, wherein the microwell comprises a chemically-modified zone.

18. The device of claim 10, wherein the microwell comprises a zone which exhibits hydrophobic and non-adsorptive properties with respect to the analytes.

19. The device of claim 10, wherein the microwell comprises a zone which exhibits hydrophobic and adsorptive properties with respect to analytes.

20. The device of claim 10, wherein the microwell and the intermediate electro-wettable site are shaped to enable the liquid sample to simultaneously contact the microwell and the intermediate electro-wettable site.

21. The device of claim 10, wherein the electro-wettable sites are at least partially nested.

22. The device of claim 10, wherein the electro-wettable sites are elliptically shaped.

23. The device of claim 10, wherein the device is a laminate comprising a non-conducting substrate.